



## DC Input 8-Pin Phototransistor Optocoupler

### Features

- High isolation 5000 VRMS
- DC input with transistor output
- Operating temperature range - 55 °C to 110 °C
- External Creepage  $\geq 7.5\text{mm}$  (S/SL Type)
- External Creepage  $\geq 8.0\text{mm}$  (SLM Type)
- RoHS compliant
- REACH compliance
- Green material
- Regulatory Approvals
  - UL - UL1577 (E364000)
  - VDE - EN60747-5-5(VDE0884-5)
  - CQC – GB4943.1, GB8898
  - IEC60065, IEC60950

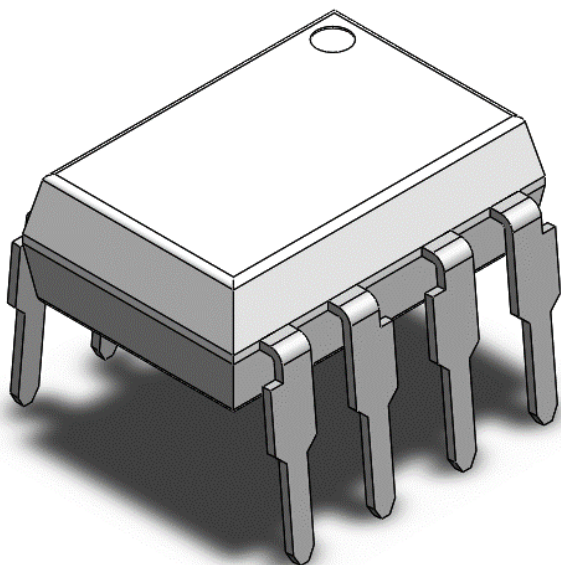
### Description

The CT827 series consists of dual channels each contains a photo transistor optically coupled to a gallium arsenide Infrared-emitting diode in a 8-lead DIP package different lead forming options.

### Applications

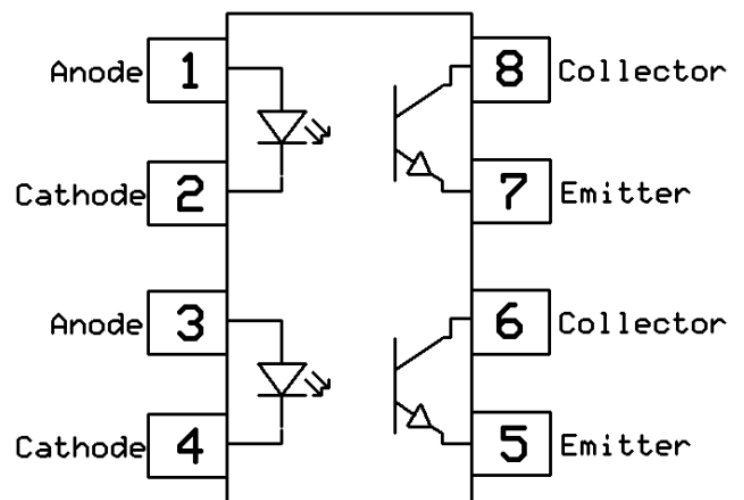
- Switch mode power supplies
- Computer peripheral interface
- Microprocessor system interface

### Package Outline



Note: Different lead forming options available. See package dimension.

### Schematic



**Absolute Maximum Rating at 25°C**

<b>Symbol</b>	<b>Parameters</b>	<b>Ratings</b>	<b>Units</b>	<b>Notes</b>
V <sub>ISO</sub>	Isolation voltage	5000	V <sub>RMS</sub>	
P <sub>TOT</sub>	Total power dissipation	200	mW	
T <sub>OPR</sub>	Operating temperature	-55 ~ +110	°C	
T <sub>STG</sub>	Storage temperature	-55 ~ +150	°C	
T <sub>SOL</sub>	Soldering temperature	260	°C	
<b>Emitter (1 circuit)</b>				
I <sub>F</sub>	Forward current	60	mA	
I <sub>F(TRANS)</sub>	Peak transient current (≤1μs P.W,300pps)	1	A	
V <sub>R</sub>	Reverse voltage	6	V	
P <sub>D</sub>	Emitter power dissipation	100	mW	
<b>Detector (1 circuit)</b>				
P <sub>D</sub>	Detector power dissipation	150	mW	
B <sub>VCEO</sub>	Collector-Emitter Breakdown Voltage	80	V	
B <sub>VECO</sub>	Emitter-Collector Breakdown Voltage	7	V	
I <sub>C</sub>	Collector Current	50	mA	

**Electrical Characteristics**  $T_A = 25^\circ\text{C}$  (unless otherwise specified)**Emitter Characteristics**

Symbol	Parameters	Test Conditions	Min	Typ	Max	Units	Notes
$V_F$	Forward voltage	$I_F = 10\text{mA}$		1.24	1.4	V	
$I_R$	Reverse Current	$V_R = 6\text{V}$	-	-	5	$\mu\text{A}$	
$C_{IN}$	Input Capacitance	$f = 1\text{MHz}$	-	10	30	pF	

**Detector Characteristics**

Symbol	Parameters	Test Conditions	Min	Typ	Max	Units	Notes
$B_{V_{CEO}}$	Collector-Emitter Breakdown	$I_C = 100\mu\text{A}$	80	-	-	V	
$B_{V_{ECO}}$	Emitter-Collector Breakdown	$I_E = 100\mu\text{A}$	7	-	-	V	
$I_{CEO}$	Collector-Emitter Dark Current	$V_{CE} = 20\text{V}, I_F = 0\text{mA}$	-	-	100	nA	

**Transfer Characteristics**

Symbol	Parameters	Test Conditions	Min	Typ	Max	Units	Notes	
CTR	Current Transfer Ratio	$I_F = 5\text{mA}, V_{CE} = 5\text{V}$	CT827	50		600	%	
			CT827A	80		160		
			CT827B	130		260		
$V_{CE(SAT)}$	Collector-Emitter Saturation Voltage	$I_F = 20\text{mA}, I_C = 1\text{mA}$	-	0.1	0.2	V		
$R_{IO}$	Isolation Resistance	$V_{IO} = 500\text{V}_{DC}$	$5 \times 10^{10}$			$\Omega$		
$C_{IO}$	Isolation Capacitance	$f = 1\text{MHz}$		0.5	1	pF		

**Switching Characteristics**

Symbol	Parameters	Test Conditions	Min	Typ	Max	Units	Notes
$t_r$	Rise Time	$I_C = 2\text{mA}, V_{CE} = 2\text{V}$	-	6	18	$\mu\text{s}$	
$t_f$	Fall Time	$R_L = 100\Omega$	-	8	18		



Typical Characteristic Curves

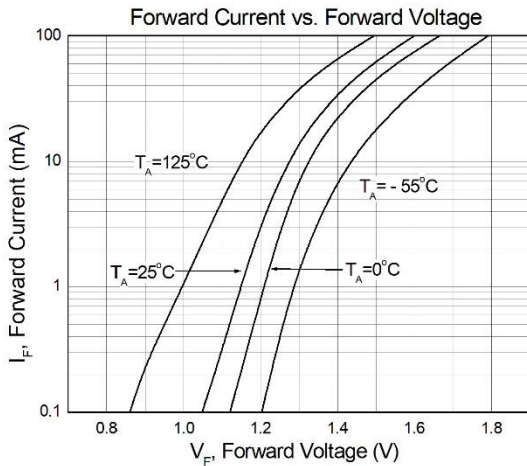


Figure 2

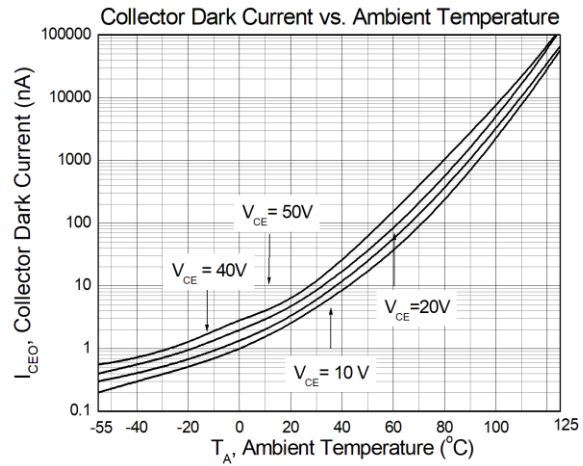


Figure 3

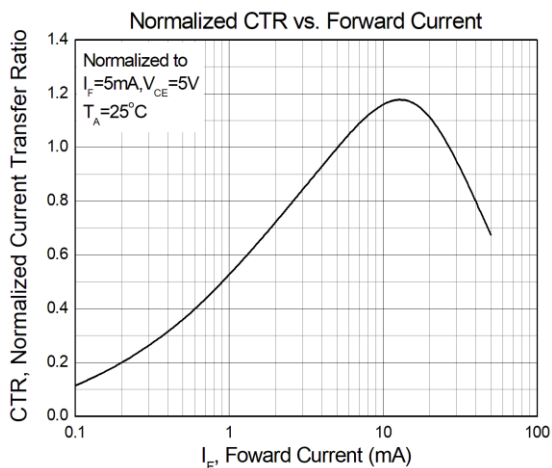


Figure 4

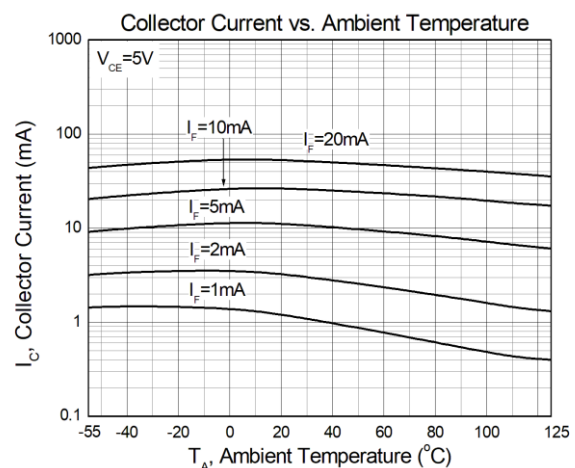


Figure 5

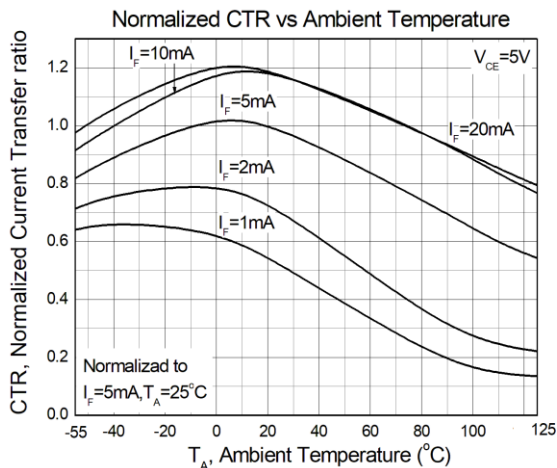


Figure 6

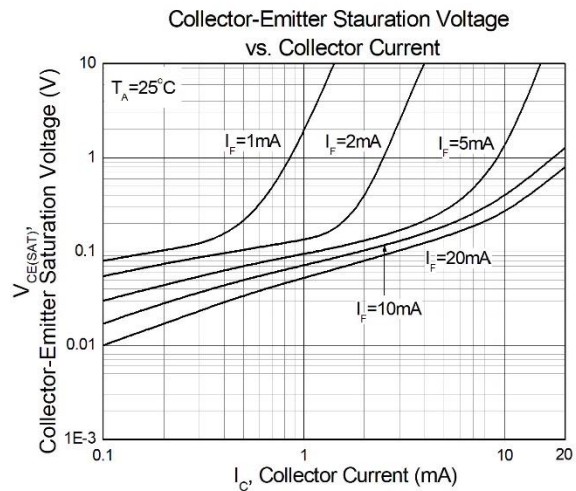


Figure 7



Collector-Emitter Saturation Voltage vs. Forward Current

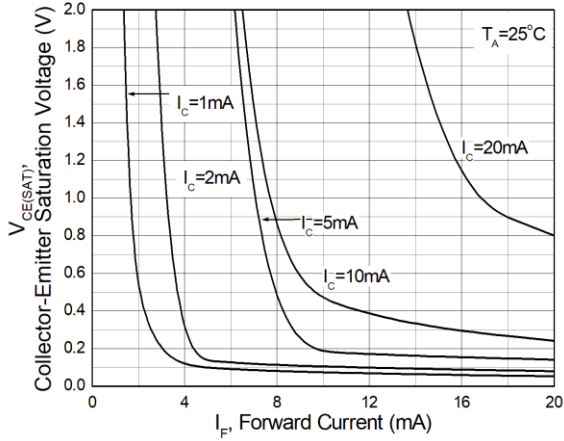


Figure 8

Switching Speed vs. Load Resistance

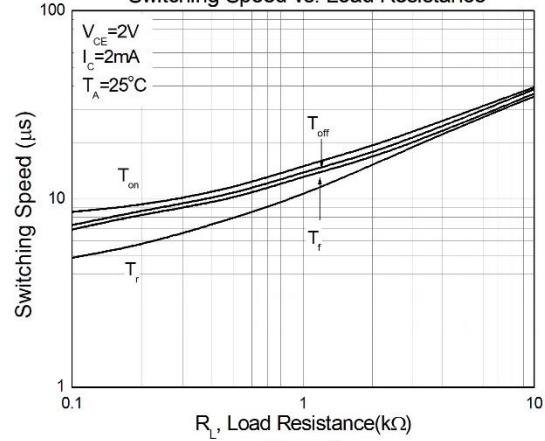


Figure 9

Voltage Gain vs. Frequency

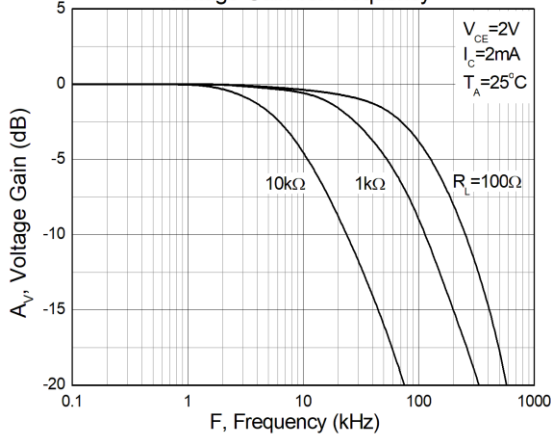


Figure 10



Test Circuit

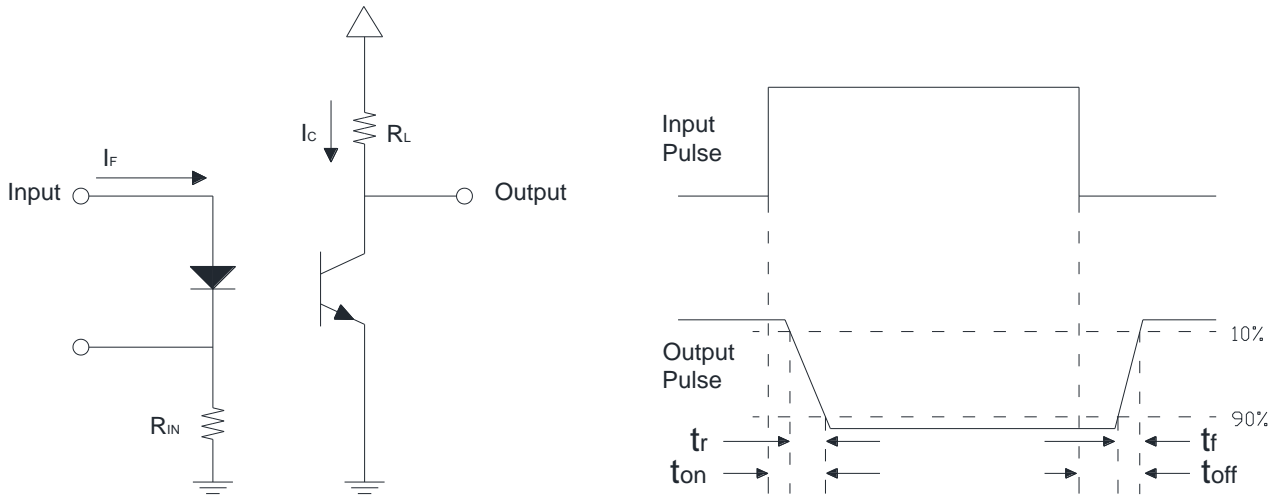
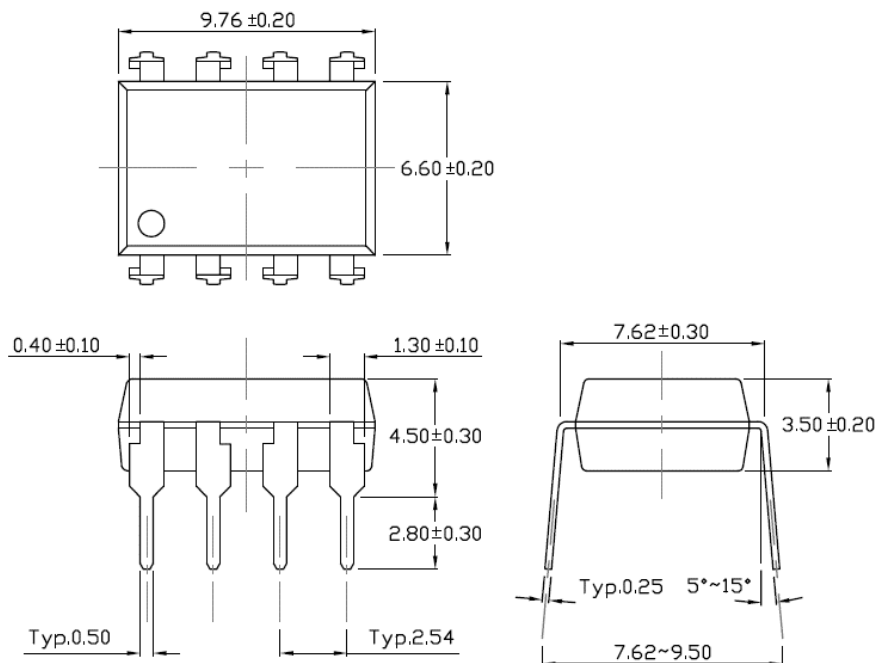


Figure 12: Switching Time Test Circuits

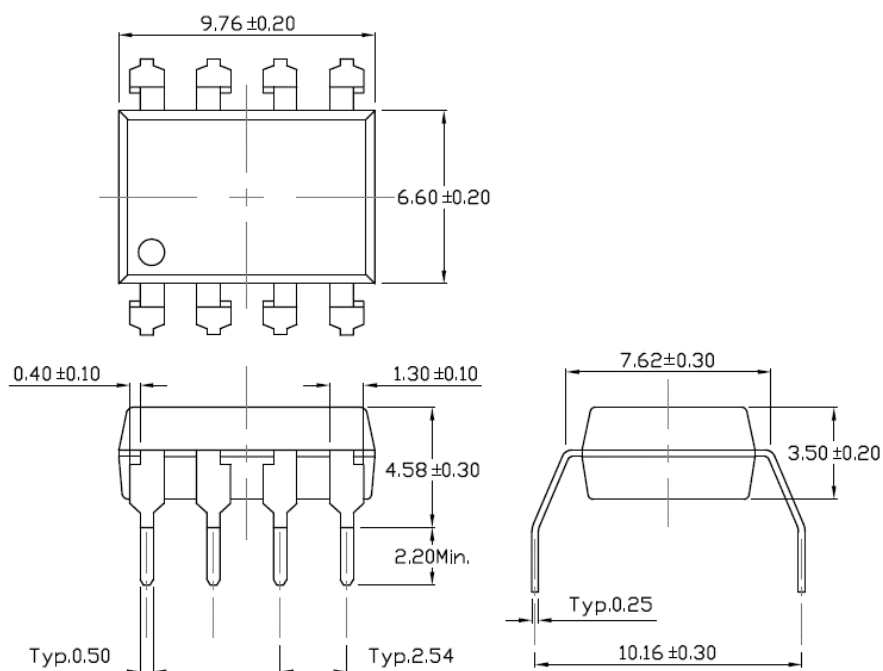


**Package Dimension** *Dimensions in mm unless otherwise stated*

**Standard DIP – Through Hole**

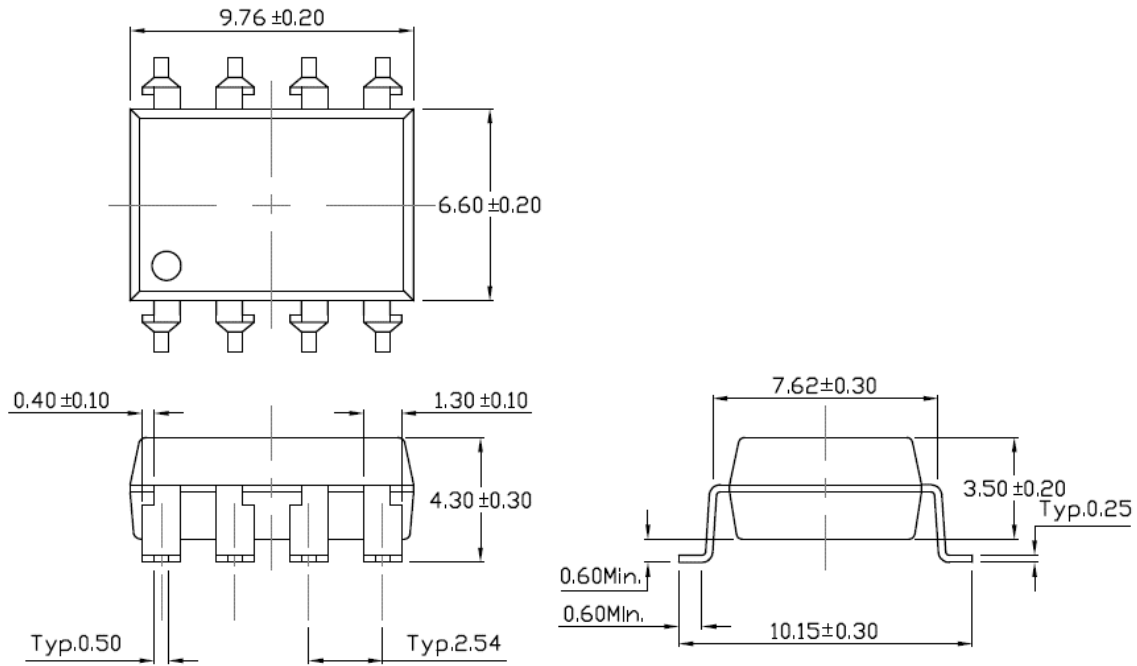


**Gullwing (400mil) Lead Forming – Through Hole (M Type)**

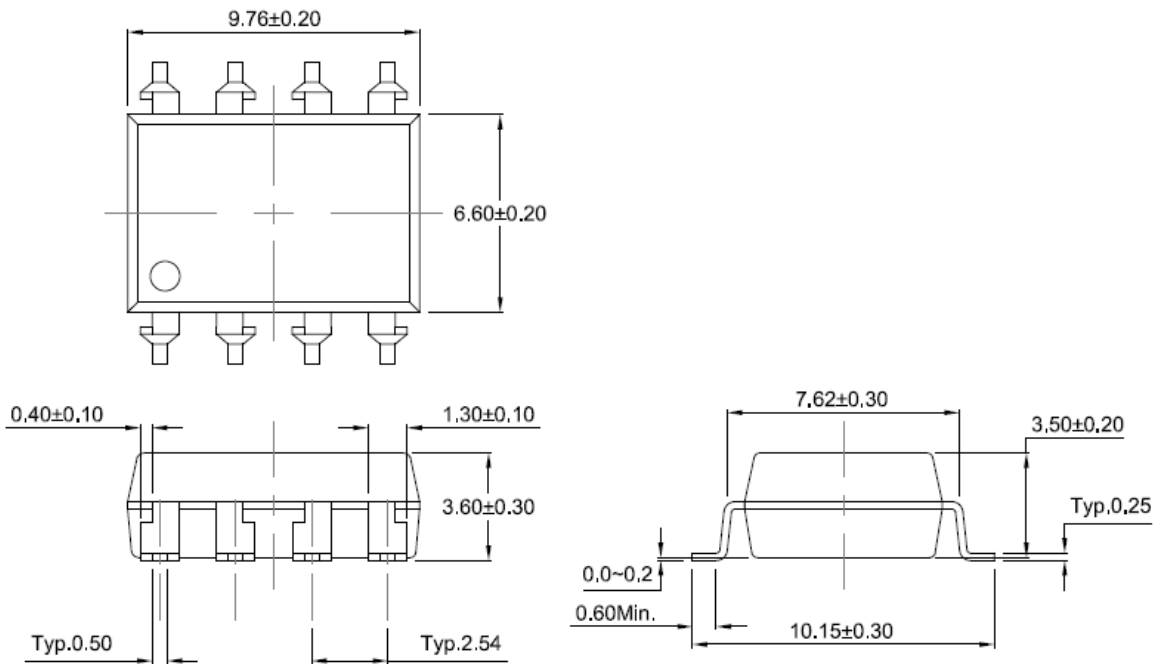




Surface Mount Lead Forming (S Type)



Surface Mount (Low Profile) Lead Forming (SL Type)



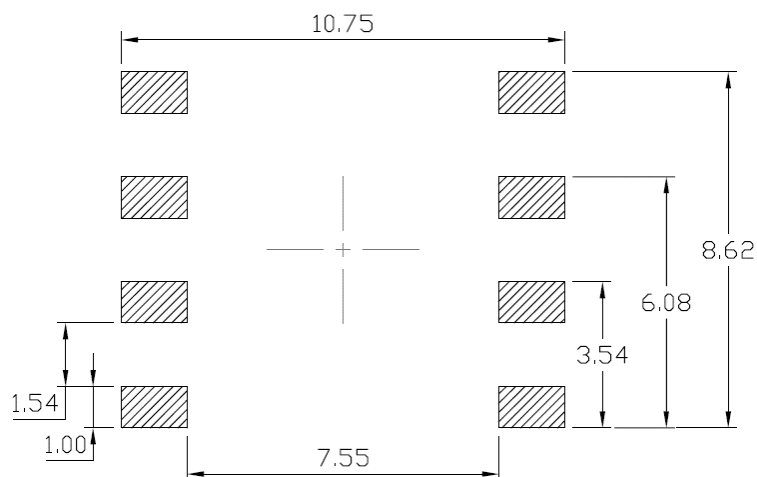




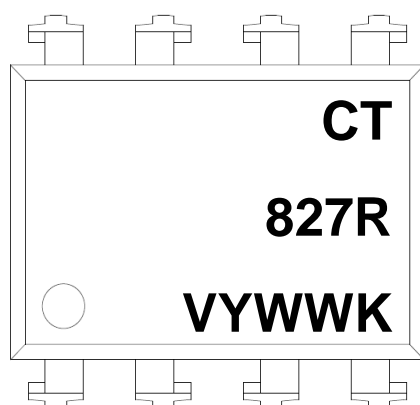
CT827 Series

## DC Input 8-Pin Phototransistor Optocoupler

### Recommended Solder Mask *Dimensions in mm unless otherwise stated*



### Device Marking



#### Note:

- CT : Denotes "CT Micro"
- 827 : Product Number
- R : CTR Rank
- V : VDE Option
- Y : Fiscal Year
- WW : Work Week
- K : Production Code



**Ordering Information**

**CT827X(V)(Y)(Z)**

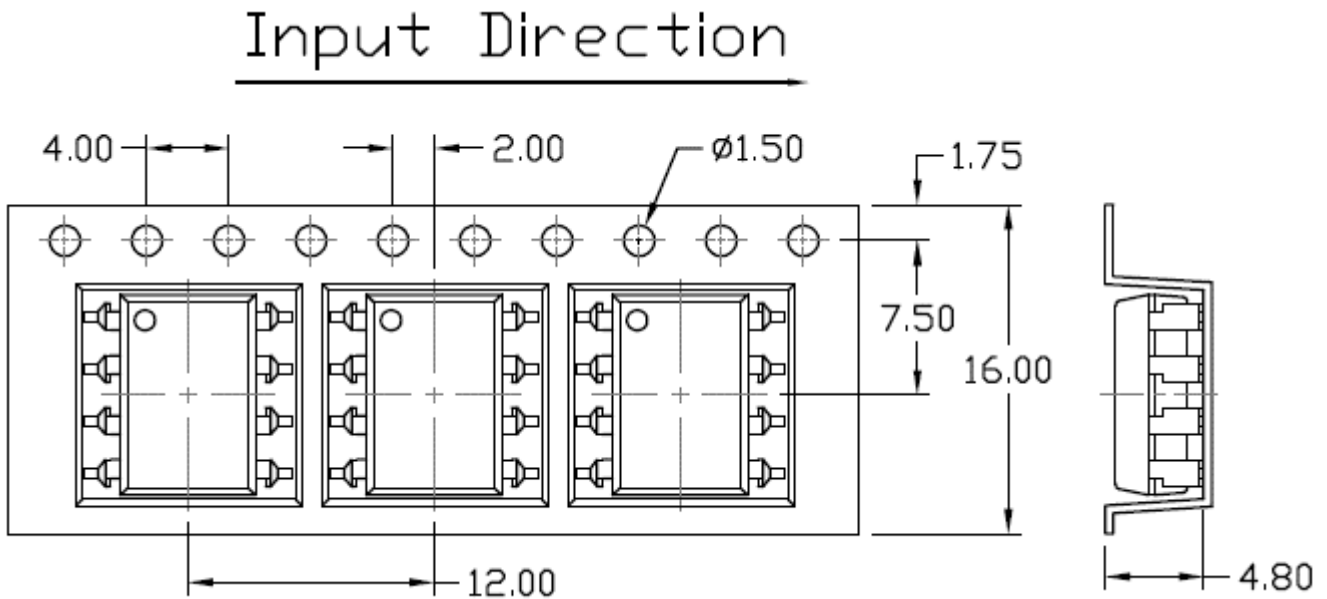
- CT =Denotes “CT Micro”
- 827 =Product Number
- X = Part No. (X=A, B or None)
- V = VDE Option ( V or None)
- Y = Lead form option (S, SL, M or none)
- Z = Tape and reel option (T1, T2 or none)

<b>Option</b>	<b>Description</b>	<b>Quantity</b>
None	Standard 8 Pin Dip	40 Units/Tube
M	Gullwing (400mil) Lead Forming	40 Units/Tube
S(T1)	Surface Mount Lead Forming – With Option 1 Taping	1000 Units/Reel
S(T2)	Surface Mount Lead Forming – With Option 2 Taping	1000 Units/Reel
SL(T1)	Surface Mount (Low Profile) Lead Forming– With Option 1 Taping	1000 Units/Reel
SL(T2)	Surface Mount (Low Profile) Lead Forming– With Option 2 Taping	1000 Units/Reel

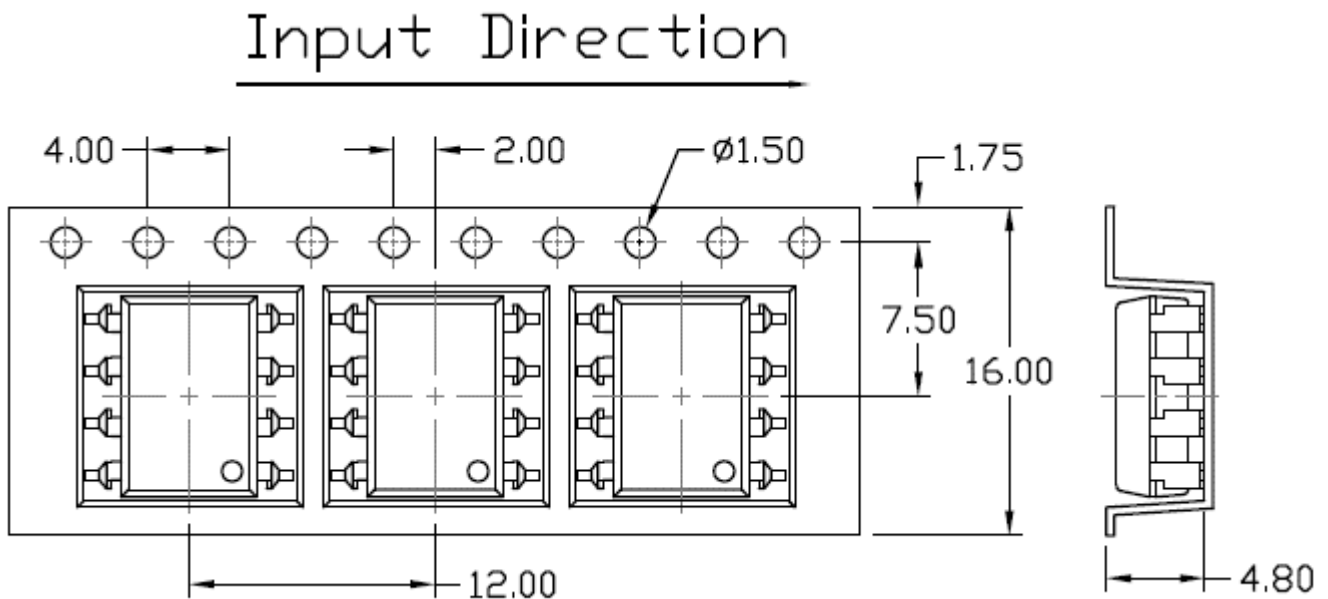


**Carrier Tape Specifications** *Dimensions in mm unless otherwise stated*

**Option S(T1) & SL(T1)**



**Option S(T2) & SL(T2)**





**Wave soldering (follow the JEDEC standard JESD22-A111)**

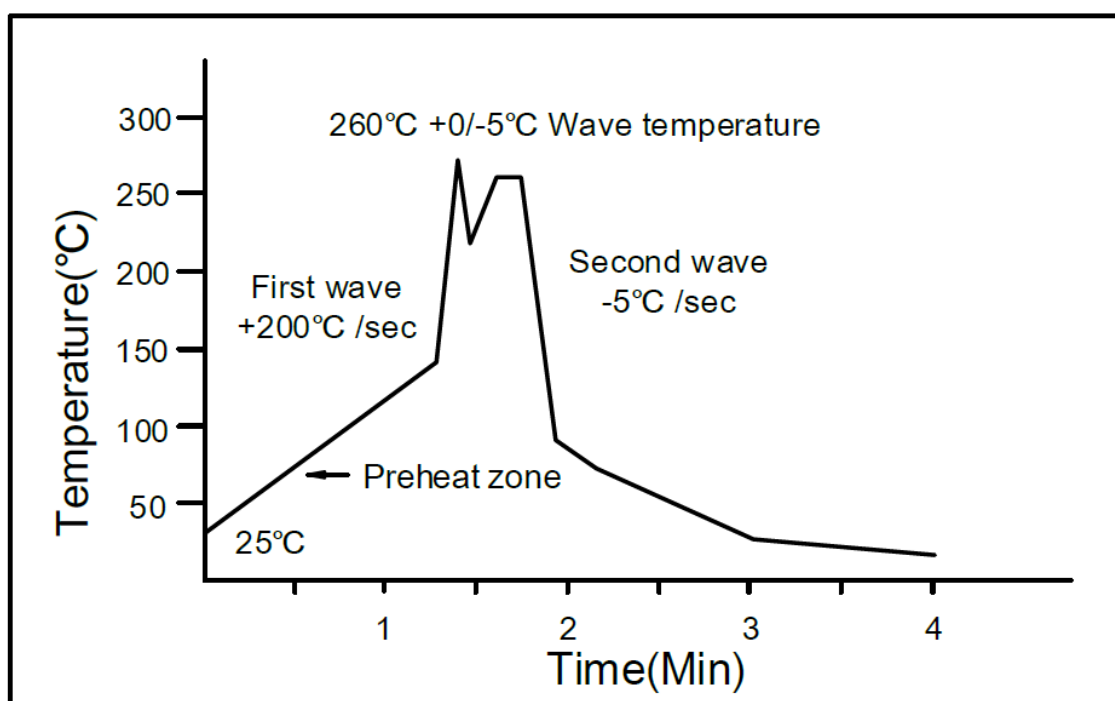
One time soldering is recommended within the condition of temperature.

Temperature: 260+0/-5°C.

Time: 10 sec.

Preheat temperature: 25 to 140°C.

Preheat time: 30 to 80 sec.



**Hand soldering by soldering iron**

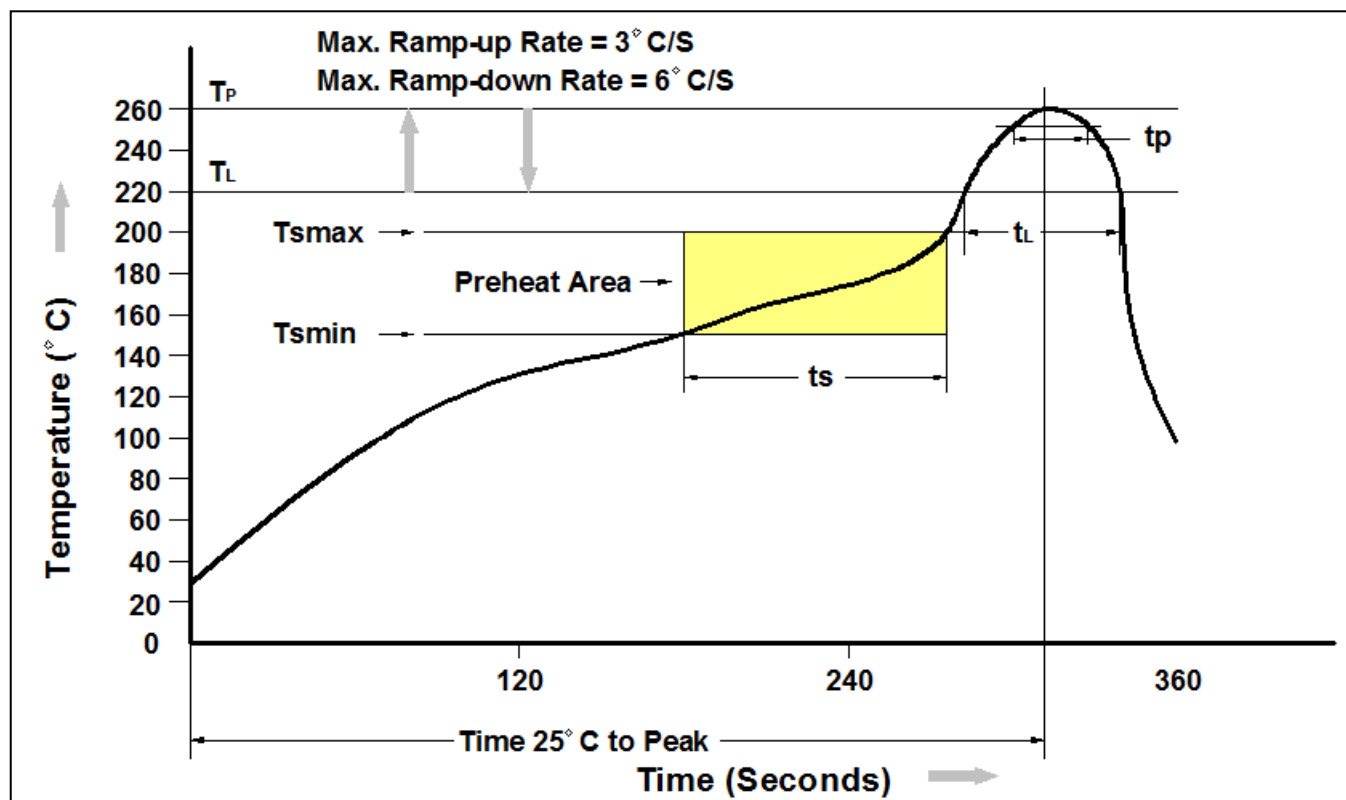
Allow single lead soldering in every single process.

One time soldering is recommended. Temperature: 380+0/-5°C

Time: 3 sec max.



Reflow Profile



Profile Feature	Pb-Free Assembly Profile
Temperature Min. (T <sub>smin</sub> )	150°C
Temperature Max. (T <sub>smax</sub> )	200°C
Time (t <sub>s</sub> ) from (T <sub>smin</sub> to T <sub>smax</sub> )	60-120 seconds
Ramp-up Rate (t <sub>L</sub> to t <sub>P</sub> )	3°C/second max.
Liquidous Temperature (T <sub>L</sub> )	217°C
Time (t <sub>L</sub> ) Maintained Above (T <sub>L</sub> )	60 – 150 seconds
Peak Body Package Temperature	260°C +0°C / -5°C
Time (t <sub>P</sub> ) within 5°C of 260°C	30 seconds
Ramp-down Rate (T <sub>P</sub> to T <sub>L</sub> )	6°C/second max
Time 25°C to Peak Temperature	8 minutes max.



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